ISO 22745
Open Technical Dictionaries and their Application to Master Data

PMRIPT Meeting

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Battle Creek, MI

Goals

- Cataloging
  - *The art of creating and maintaining quality master data*
    - What is master data?
    - Why is it so important?
    - Where does it come from?
    - Creating and maintaining quality master data

ISO 22745

- This standard specifies a system for descriptive technology consisting of:
  - open technical dictionary (OTD)
  - identification guide (IG)
  - master data
  - identification scheme
  - procedures for maintenance of an OTD
  - interfaces for querying information from an OTD, including terminology related to a given concept

ISO 22745

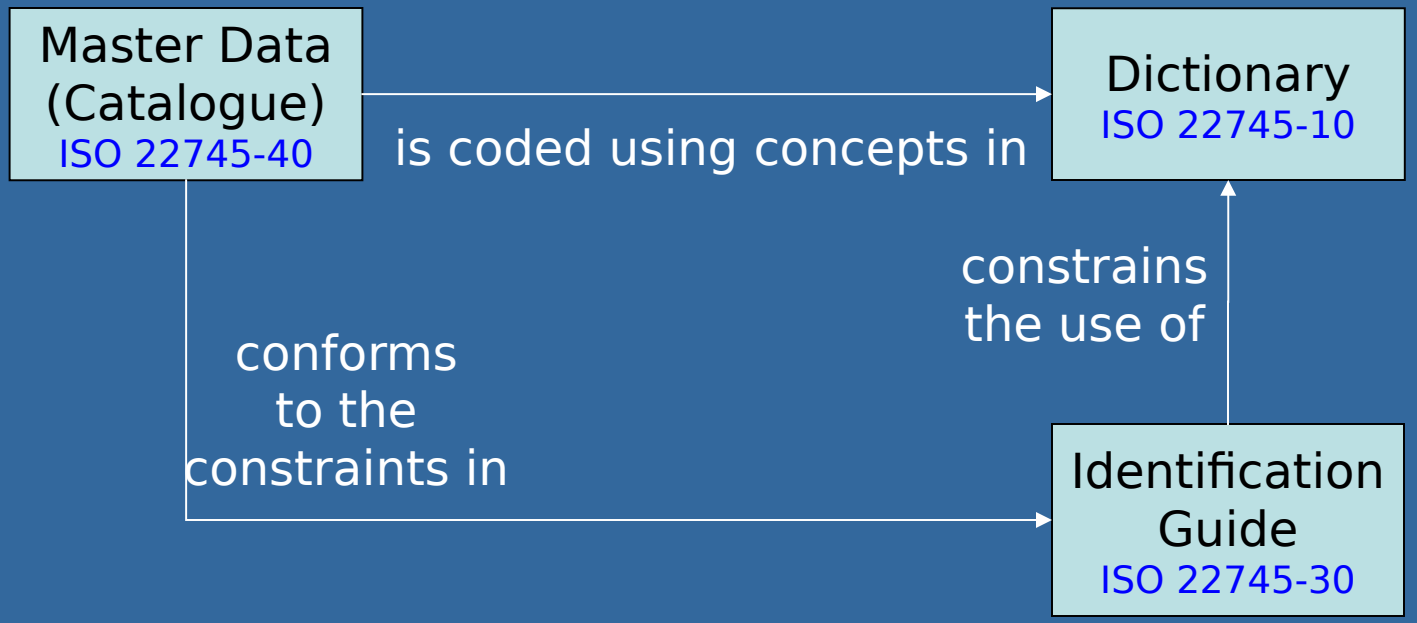
- Under ISO TC184/SC4/WG12, Common resources

ISO 22745 Planned Parts

Part 1: Overview
Part 2: Terminology
Part 10: Dictionary representation
Part 11: Guidelines for the formulation of master data terminology
Part 13: Identification of concepts and terminology
Part 14: Dictionary query interface
Part 20: Procedures for the maintenance of an open technical dictionary
Part 30: Identification guide representation
Part 40: Master data representation
Part 41: Query for master data*
Part 50: Structure and operation of the registration authority
Part 200: Implementation guide for incorporating cataloguing information into ISO 10303 product data
Part 3xx: Master data guides**

* Potential future part
** Current NWI ballot

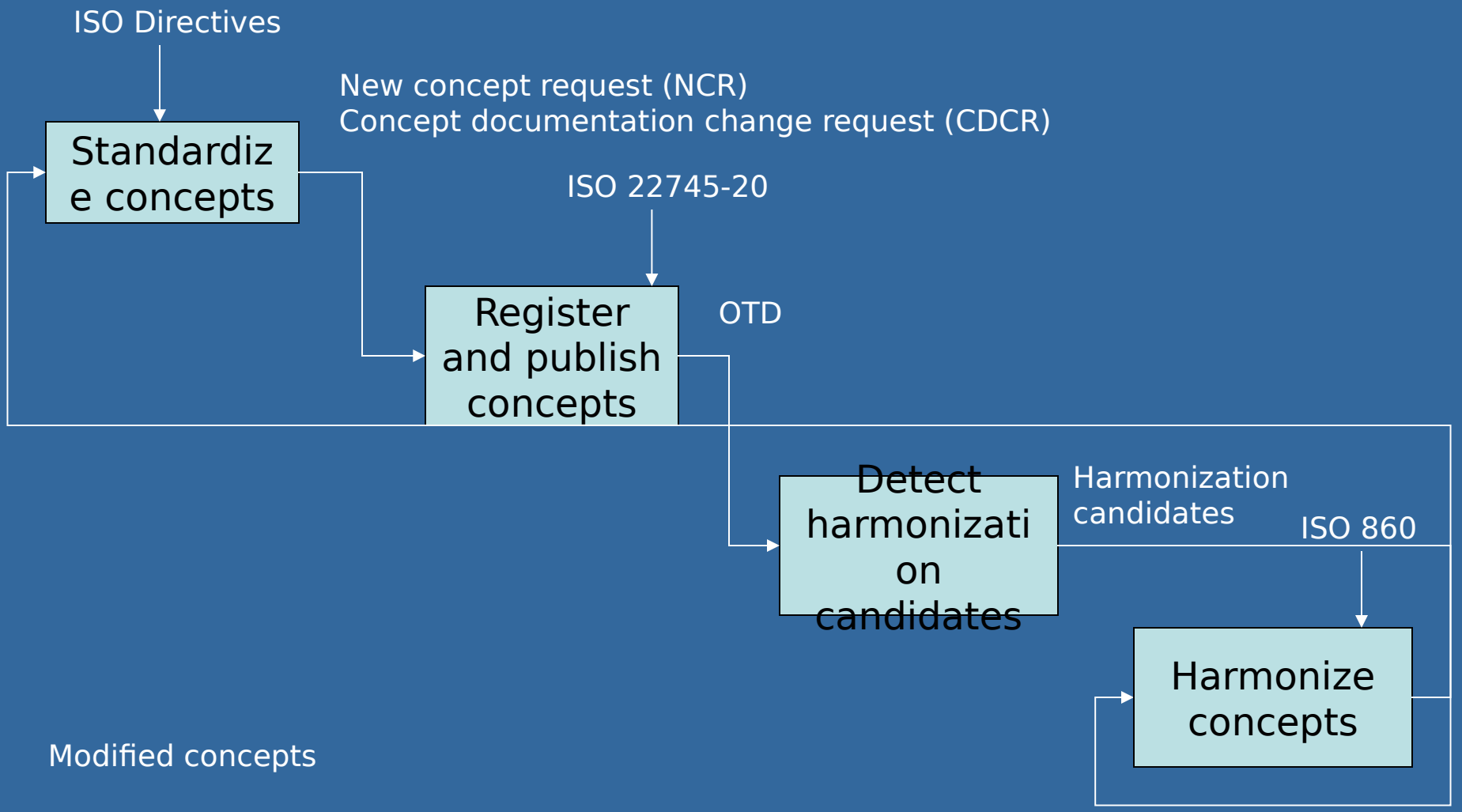
Data Models


Master Data
(Catalogue)
ISO 22745-40
is coded using concepts in
Dictionary
ISO 22745-10
conforms
to the
constraints in
constrains
the use of
Identification
Guide
ISO 22745-30

Types of Dictionaries

- Content creating
  - Procedure not specified in ISO 22745
  - Use of a standard procedure, e.g., consolidated procedure, is recommended
- Content collecting
  - Uses:
    - Integrating master data coded to different dictionaries
    - Harmonizing content creating dictionaries and terminology standards
  - Procedure specified in ISO 22745-20

Functional Model



General Principles

- Multi-lingualism
  - The dictionary model is inherently multi-lingual
  - Each term, definition and abbreviation is associated with a language
  - Each image may be associated with 0 or more languages

Part 10: Dictionary representation

Dictionary Model Classes (1)

- Basic classes
  - Concept: as defined in ISO 1087-1
  - ConceptType: metadata for Concept
  - ConceptEquivalenceRelationship: assertion that two Concepts mean the same thing

Concept

- Unit of knowledge created by a unique combination of characteristics
- => Concept is defined intensionally

Concept Intension and Extension

- **intension:** set of characteristics which makes up the concept

  [ISO 1087-1]

- **extension:** totality of objects to which a concept corresponds

  [ISO 1087-1]

- Concepts can have the different intensions but the same extension

Concept Equivalence Relationship

- Equivalence relationship between two Concepts is registered if it is agreed that they have the same intended intension and extension

Dictionary Model Classes (2)

- Terminological Item
  - Language-based: is in one or more languages
    - Term: as defined in ISO 1087-1
    - Abbreviation: as defined in ISO 1087-1
    - Definition: as defined in ISO 1087-1
    - Image: graphical depiction of a Concept
  - Symbol: as defined in ISO 1087-1
    - GraphicalSymbol: symbol that is represented by a graphic
    - TextualSymbol: symbol that is represented by a character string

Dictionary Model Classes (3)

- Terminological Item
  - TerminologicalItemSource: document element that is the source of a TerminologicalItem
  - Document
  - Standard: normative document
  - SourceLocation: place where a TerminologicalItem can be found on the internet

Dictionary Model Classes (4)

- Concept types
  - Class
  - Property
  - Feature
  - Representation
  - Unit of Measure
  - Qualifier of Measure
  - Value of Property
  - Currency

Examples of Concepts

- Class
  - machine bolt
  - self-aligning plain bearing
- Property
  - thread series designator
  - thread diameter
- Feature
  - flange
  - inner liner
  - outer ring
  - second hole
- Representation
  - decimal number 2 or more digits followed by decimal point followed by 1 to 7 digits
- Unit of Measure
  - degree
  - radian
  - kilogram
  - newton per square millimeter
- Qualifier of Measure
  - nominal
  - minimum
  - maximum
- Value of Property
  - Monday
  - Tuesday
  - iron
- Currency
  - US Dollar
  - Euro

Dictionary Model Classes (5)

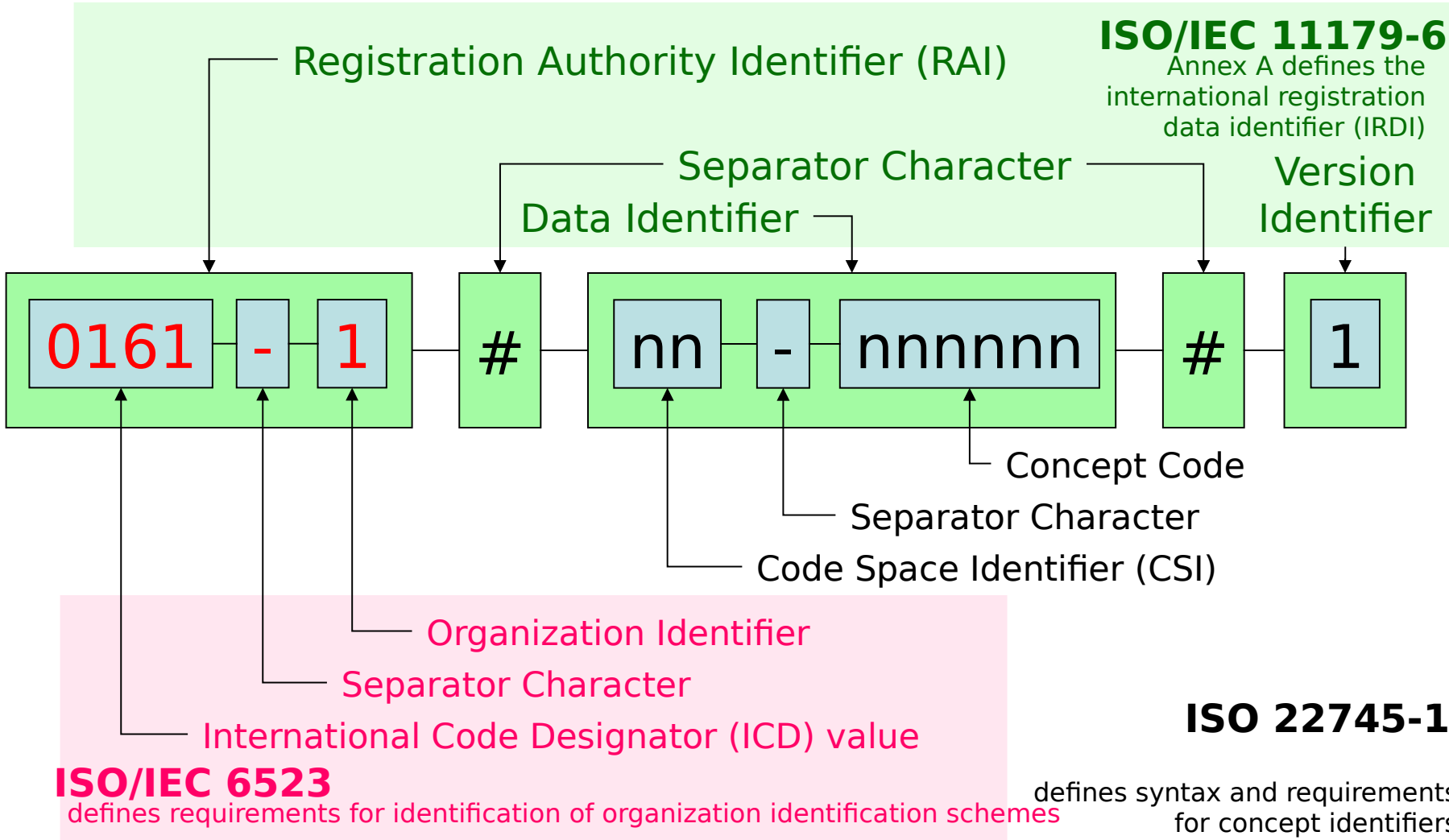
- Multilingualism
  - Language: natural language as spoken in a given geographic area (country)
  - LanguageString: a string identified as being in a given Language
  - InternationalText: a set of one or more LanguageStrings with same meaning

Dictionary Model Classes (6)

- Organization
- GraphicRepresentation
- GraphicSize

Part 13: Identification of concepts and terminology

Example: OTD Identifier



Data Types

Data Types

- Boolean
- String
- Localized text
- Numeric
  - Rational
  - Real
- Day interval
  - Year
  - Year-month
  - Date
- Controlled value
- Measure
  - Measure number
  - Measure range
- Composite
- Set
- Sequence
- Choice

Part 30: Identification guide representation

Identification Guides

- Link classes to properties
- Requirements determined by users
- Data requirements depend on industry, organization, function and circumstance
- Avoid cost of collecting and delivering unneeded data
- Benefit of collecting data must exceed cost

Identification Guide Model Classes (1)

- IdentificationGuide: container
- PrescribedItem: rules for describing a class of items to meet the needs of a specific data consumer
- PrescribedProperty: rules for describing a property within an IG
- ConceptUse: data consumer’s preferred terminology

Identification Guide Model Classes (2)

- PrescribedPropertyElement: association between a property and a datatype, possibly with specification of a data environment

Creating an IG from Scratch

- Identify requirements
  - Item class
  - Mandatory and optional properties
  - Data type for each property
  - Constraints
  - Controlled values (reply codes) for properties
- Register concepts not already in OTD
- Code IG in XML
- Validate XML IG
- Register XML IG with OTD registration authority
- Disseminate to users

Part 40: Master data representation

Master Data Model Classes (1)

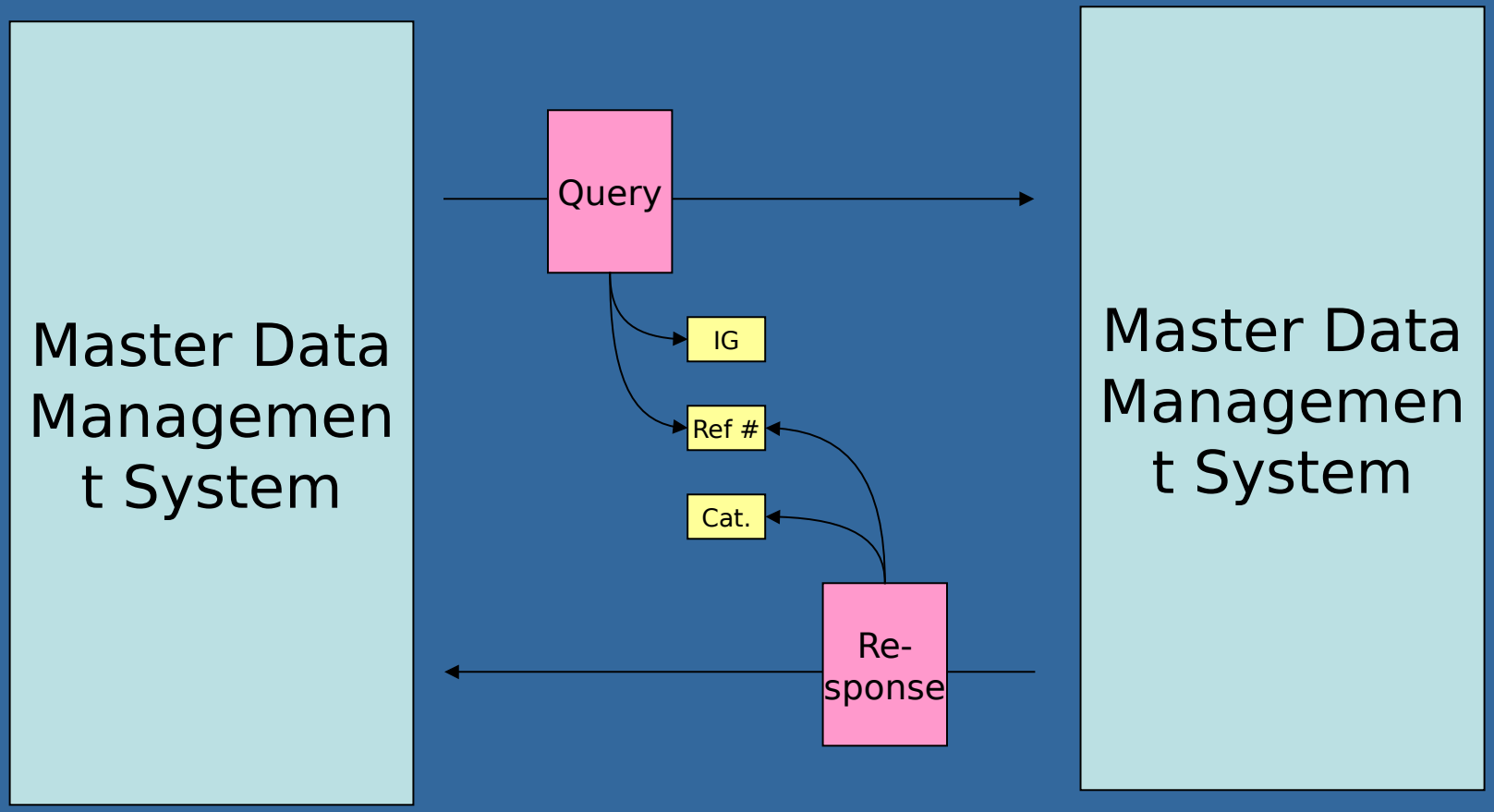
- Catalogue: collection of descriptions of items
- CatalogueHeader: container for property values that apply to entire catalogue
- CatalogueDetail: container for Items
- Item: description of a thing (instance of a class of items) using property values
- PropertyValueElement: association between a property and a value, possibly with a data environment

Master Data Model Classes (2)

- Data environment
  - DataEnvironment: Conditions under which a measurement was taken or under which a PropertyValue that is a physical quantity is valid
  - ConditionElement: PropertyValueElement that describes a condition under which a measurement was taken or under which a PropertyValue that is a physical quantity is valid

Obtaining Master Data

Buyer **Supplier**



Query and response sent via a messaging system (e.g., email)

Types of Queries

- Provide initial data on item
- Provide missing data (recipient already has some data)
- Validate data
- Provide list of reference numbers (organization id + part number) that match a set of characteristics

Part 3xx: Master data guides

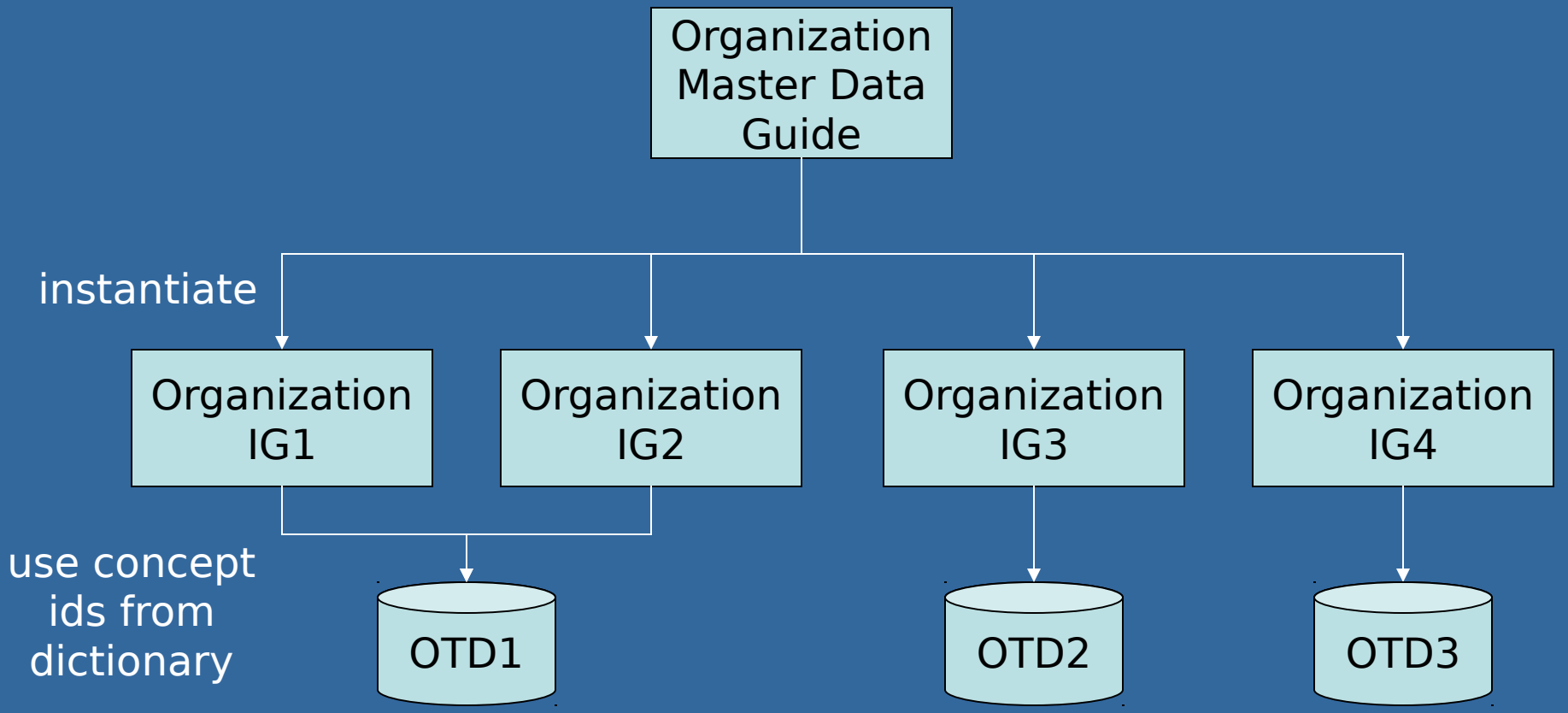
Purpose

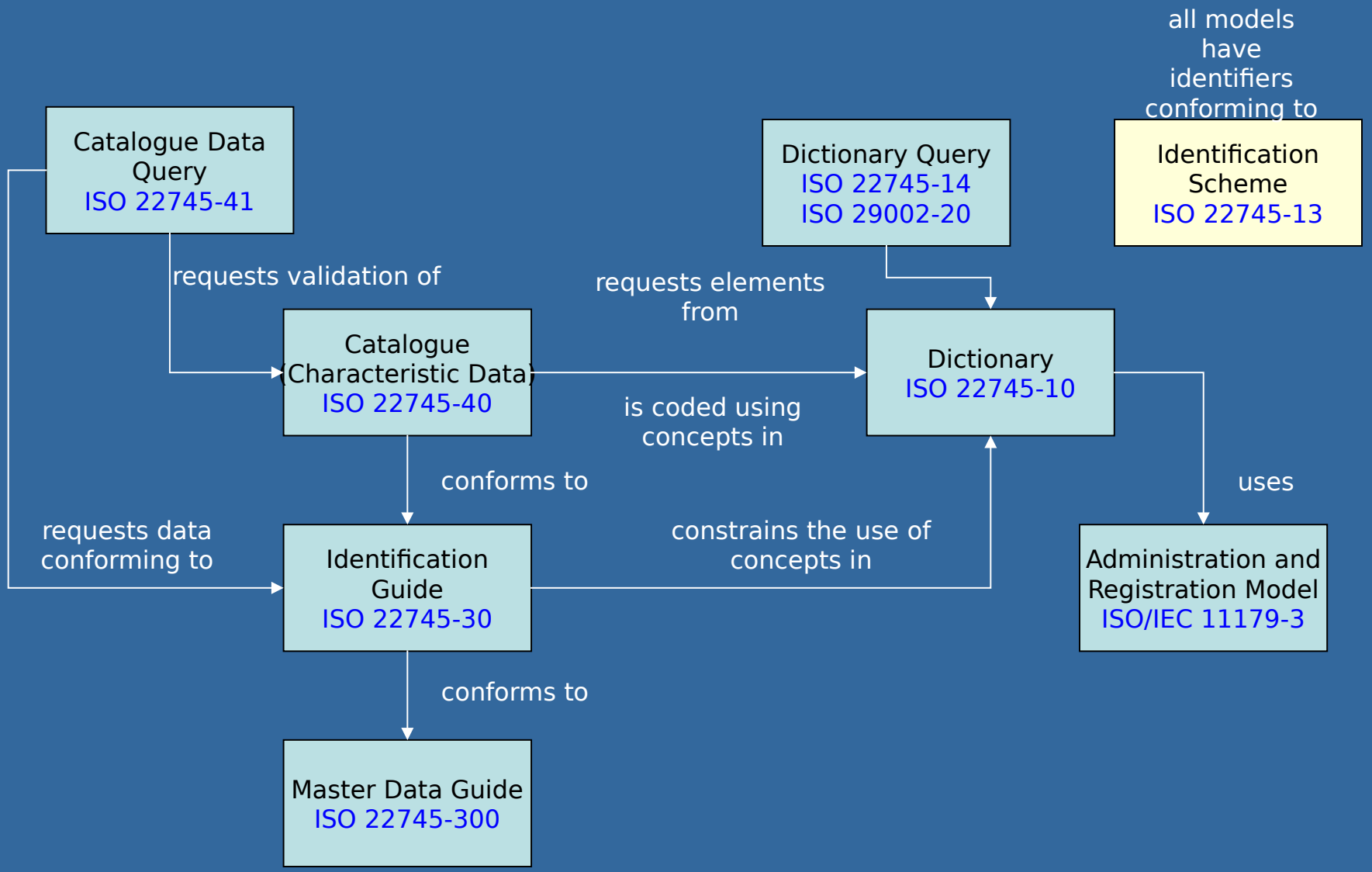
- An identification guide represents the data requirements of particular data consumers
- An identification guide is dictionary-specific because it contains identifiers for concepts in that dictionary
- For some types of master data, it may be possible to reduce variation by creating standard templates for identification guides

Master Data Guides

- Scope
  - The following are within scope of this series of parts:
    - master data templates
      - organization master
      - material master
      - asset master
      - service master
      - process master
      - location master
      - person master
      - material safety data sheet (MSDS)
    - mapping from the templates to identification guides
    - requirements for conformance of ISO 22745-30 identification guides to the templates
  - The following are outside the scope of this series of parts:
    - ISO 22745-30 compliant identification guides
  - NOTE Actual identification guides are dictionary-specific.

Master Data Guide Example

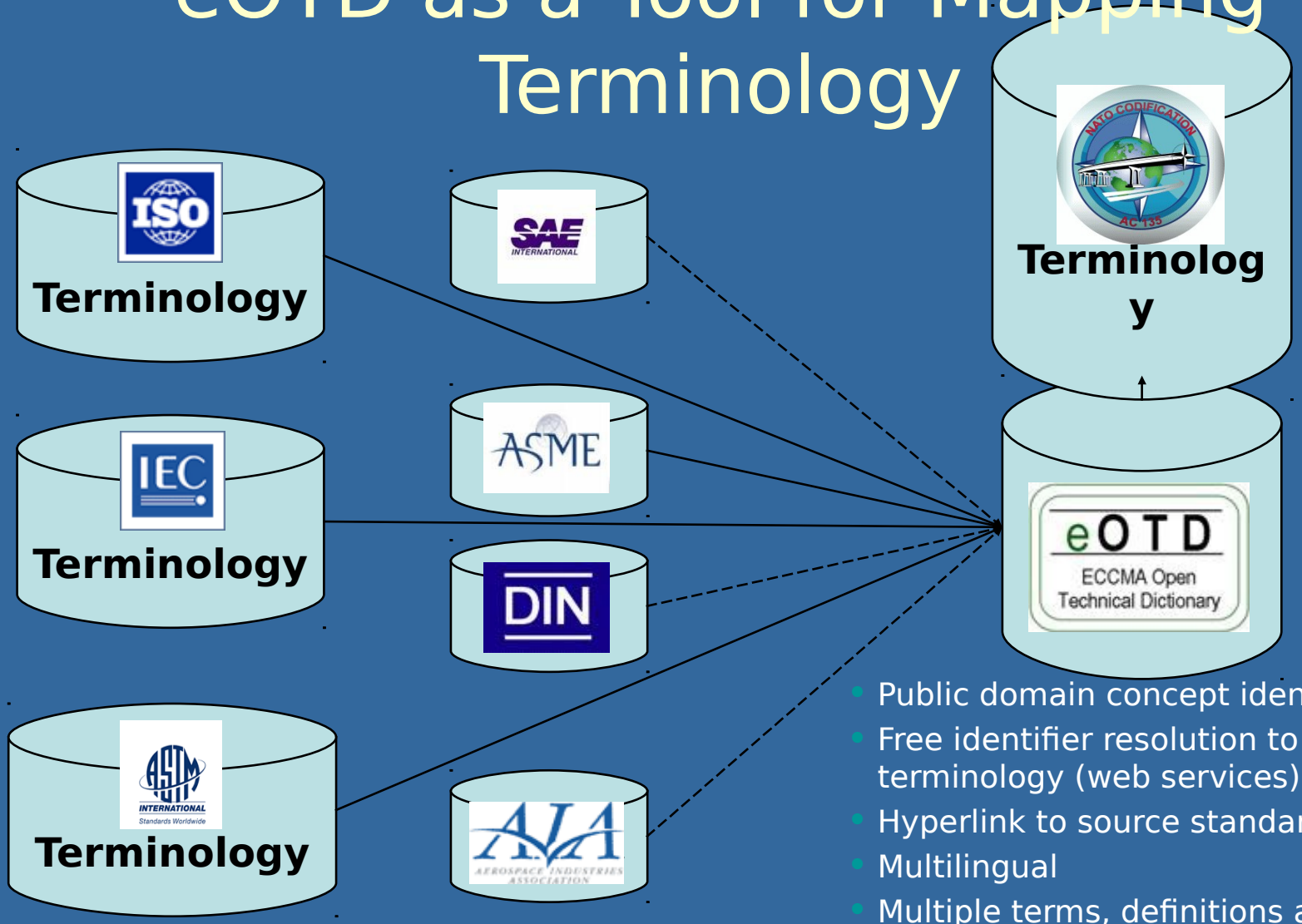



Catalogue Data Query
ISO 22745-41
requests validation of
Catalogue {Characteristic Data}
ISO 22745-40
requests elements from
Dictionary Query
ISO 22745-14
ISO 29002-20
Dictionary
ISO 22745-10
is coded using concepts in
all models have identifiers conforming to
Identification Scheme
ISO 22745-13
uses
Administration and Registration Model
ISO/IEC 11179-3
conforms to
requests data conforming to
Identification Guide
ISO 22745-30
constrains the use of concepts in
conforms to
Master Data Guide
ISO 22745-300

The ECCMA Open Technical Dictionary (eOTD)

- The eOTD is an ISO 22745 open technical dictionary of cataloging concepts used to create unambiguous language independent encoded descriptions of master data
- Memorandum of understanding (MOU) between ECCMA and NATO AC/135 governs incorporation of NATO Codification System concepts in eOTD
- Requirement that eOTD catalogue data be mappable to NCS

eOTD as a Tool for Mapping Terminology



- Public domain concept identifiers
- Free identifier resolution to underlying terminology (web services)
- Hyperlink to source standards
- Multilingual
- Multiple terms, definitions and images linked to single concept identifier

ISO 22745 Contacts

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